**INVESTIGATION:** WHAT DOES YEAST LIKE TO EAT AND WHAT HAPPENS WHEN YEAST EAT?

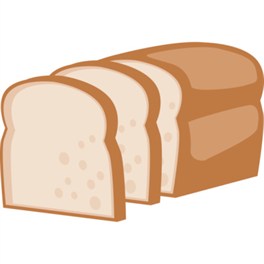
**INTRODUCTION**

Picture yourself living in ancient Egypt and imagine that it is your job to rise before the sun each day to bake crackers for your family.

Mixing up ground wheat and honey one afternoon, you are distracted. Maybe you're watching a pyramid being built just across the Nile.  You forget to cover up the cracker dough.  It sits all night in an open window, caressed by a warm breeze carrying tiny life forms that are too small to see.

When you wake the next morning, you find the dough puffed up and overflowing its bowl.  Everyone will be awake and hungry soon and you don't want to get in trouble, so you go ahead and bake it.

The crackers are not hard and flat like usual, but emerge from the hearth light, puffy and delicious. You have just baked the first bread in human history.

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No one really knows how the ancient Egyptians discovered yeast, but we have learned from their writings and artwork that they have been making bread for over 4,000 years.

How bread rose was a mystery though, until a famous scientist named Louis Pasteur proved that tiny living organisms called yeast were responsible for making bread dough puff up.

Bread yeast is a type of fungus and is related to mushrooms.  If you look at yeast cells under a microscope, you will see that they are shaped like balloons and footballs.  The single-celled organisms reproduce themselves by making tiny buds that will become new yeast cells. Below is what it looks like under a microscope when stained a blue color.

Since yeasts are tiny living organisms, they must eat to live and grow. In the following investigation, you will investigate what yeast most like to eat and discover what happens when yeast eat food.

**MATERIALS**

Dried yeast cells

Warm Water

White flour

Table sugar

Artificial sugar

Salt

Sandwich-sized Zip-loc bags

Balance and 50-mL graduated cylinder

Tape measure

Thermometer

Sharpie

**PROCEDURE – DAY 1**

Each group will need 3 Zip-loc bags. Each group will be assigned one of the following variables to test.

Salt – ½ tsp.

Salt – 1 tsp.

Sugar – ½ tsp.

Sugar – 1 tsp.

Flour – ¼ cup

Flour – ½ cup

Artificial sugar – ½ tsp

Artificial sugar – 1 tsp

**BAG 3**

**(TEST BAG)**

Yeast + water + variable

**BAG 2**

**(WATER BAG)**

Control 2 –

Yeast + water

**BAG 1**

**(DRY BAG)**

Control 1–

Yeast + variable

1. Label and mass each plastic bag. Record your results in the chart below.
2. Add ¼ teaspoon of dried yeast to each bag.
3. Add the appropriate amount of your variable to the Control 1 (Dry bag) and to Bag 3 (test bag).
4. Measure out 50 mL of water using a graduated cylinder. Record the temperature of the water and then add itbag 2. Repeat for bag 3.
5. Mass each bag and record your results.
6. Write down which variable you used on the bag and in the chart below.

**OBSERVATIONS**

Record your observations for each bag.

**BAG 1:** Control 1

**BAG 2:** Control 2

**BAG 3:** Test Bag

**TABLE OF RESULTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Control 1 | Control 2 | Variable - | Temperature | Date and Time |
| Mass of empty bag |  |  |  | x |  |
| Mass of bag with ingredients (Day 1) |  |  |  |  |  |
| Mass of bag with ingredients (Day 2) |  |  |  |  |  |

**PREDICTIONS:**

What do you think is going to happen in each of the 3 bags? Write your predictions.

**BAG 1:** We think that …..

**BAG 2:** We think that …..

**BAG 3:** We think that ……

What are experimental controls and why do you think there are two different control bags?

Why do you think we recorded the temperature of the water used?

Why do you think we took the masses on Day 1 and again on Day 2?

**PROCEDURE – DAY 2**

1. Record observations for each bag. Were there changes from yesterday? If yes, what changes did you observe? If no, describe what you see today.

**BAG 1:** Control 1

**BAG 2:** Control 2

**BAG 3:** Test Bag

2. Mass each bag and record your results in the chart. Compare yesterday’s and today’s masses. Were they the same or different? What do you think happened?

3. What other measuring devices can you use to get data that would answer the investigative question, what do yeast like to eat?

**RESULTS**

Do you think that yeast like to eat what you chose as the variable to test?

Why do you think this? Explain your results.

**COMPARATIVE CLASS DATA**

You will now have a chance to look at the results of the other variables tested by your classmates. You will first do a Gallery Walk and record observations about yeast and the other variables tested. You will use the table below to record your observations. Then, gather together with you group and decide which variable yeast most like to eat and a reason for this decision.

|  |  |
| --- | --- |
|  | TEST BAG Observations |
| Salt – 1 tsp. |  |
| Salt – 2 tsp. |  |
| Sugar – 1 tsp. |  |
| Sugar – 2 tsp. |  |
| Flour – ¼ cup |  |
| Flour – ½ cup |  |
| Artificial sugar – ½ packet |  |
| Artificial sugar – 1 packet |  |

**CONCLUSIONS**

Based on the above observations and data, our group concludes that yeast most like to eat …..

We based our conclusions on ………

We think yeast most like to eat \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because we noticed that (this happens) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when yeast eat this food.

For our next investigation into what helps yeast grow, we would like to try ……..